REMARKS

I. Introduction

In response to the Office Action dated November 10, 2005, claims 3, 41, and 44 have been amended. Claims 1-5 and 7-46 remain in the application. Re-examination and re-consideration of the application, as amended, is requested.

II. Claim Amendments

Applicants' attorney has made amendments to the claims as indicated above. These amendments were made solely for the purpose of clarifying the language of the claims, and were not required for purposes of patentability.

III. Office Action Objections

On page 2, the Office Action objects to claim 3 because of informalities. The Applicants thank the Examiner for noting this error. Claim 3 has been amended accordingly.

On page 2, the Office Action objects to claims 41-43 because "it is not clear that the claims is trying to claim a method rather than an apparatus". The Applicants respectfully traverse this rejection, and request that the Examiner indicate the statutory or regulatory basis (the United States Code, Code of Federal Regulations, or MPEP) where a basis for this objection can be found.

On page 3, the Office Action objects to claims 44-46 because the "legacy transmitters" should be "legacy receivers". The Applicants thank the Examiner for noting this error, and claim 44 has been amended accordingly.

On page 3, the Office Action objects to claims 44-46 because "it is not clear that the claim is trying to claim a method rather than an apparatus". The Applicants respectfully traverse this rejection, and request that the Examiner indicate the statutory or regulatory basis (the United States Code, Code of Federal Regulations, or MPEP) where a basis for this objection can be found.

IV. Office Action Double Patenting Rejection

On page (15), the Office Action indicates that 1, 2, 5, 6, 7, 10, 12, 13, 14, 15, 23, 24, 27, 28, 29, 32, 34, 35, 36, conflict with claims 1, 4-12, 19, 22, 23, and 26-30, respectively of copending of Application No. 10/068,039, and suggest that claims must be canceled under 37 C.F.R. 1.78(b).

The Applicants respectfully traverse. In accordance with MPEP § 822, cancellation is required only required when the conflicting claims are identical or conceded by the Applicant to be not patentably distinct. Neither is the case, and the rejection is therefore improper.

On page (16), the Office Action provisionally rejects claims 1, 2, 5, 6, 7, 10, 12, 13-15, 23, 24, 27-29, 32, 34-37 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 4-12, 19, 22, 23, and 26-30, respectively of copending of Application No. 10/068,039. According to the Office Action, although the conflicting claims are not identical, they are not patentably distinct from each other because claims in the present application are broader in scope.

The Applicants respectfully traverse all of these rejections, but will file a terminal disclaimer if necessary to moot this rejection when allowable subject matter is identified.

V. Non Art Rejections

On page (5), the Office Action rejected claims 39-46 under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement. The Applicants have amended the specification to expressly recite the "non-legacy" signals. Nonetheless, the Applicants respectfully traverse.

The Office Action correctly states the standard for determining whether a disclosure meets the written description requirement:

> "whether the claimed invention is described in the specification in such a way to reasonably convey to one of ordinary skill in the art that the inventors, at the time the application was filed, had possession of the claimed invention."

However, the Office Action does not comply with the MPEP Guidelines regarding such rejections. Those guidelines, as described in MPEP § 2163, require that the Examiner

> (A) Identify the claim limitation at issue; and
> (B) Establish a *prima facie* case by providing reasons why a person skilled in the art at the time the application was filed would not have recognized that the inventor was in possession of the invention as claimed in view of the disclosure of the application as filed. A general allegation of "unpredictability in the art" is not a sufficient reason to support a rejection for lack of adequate written description.

In this case, that is a monumental task, as this would amount to arguing that the disclosure of a "legacy signal" does not convey the notion of a "non-legacy signal" to one of ordinary skill in the art. It is important to note that compliance with the written description requirement does not mandate that the specific term used in the claim be repeated in the specification (MPEP § 2163.02). Instead, it can be supported through express, implicit, or inherent disclosure.

> While there is no *in haec verba* requirement, newly added claim limitations must be supported in the specification through express, implicit, or inherent disclosure. An amendment to correct an obvious error does not constitute new matter where one skilled in the art would not only recognize the existence of the error in the specification, but also recognize the appropriate correction. *In re Oda*, 443 F.2d 1200, 170 USPQ 268 (CCPA 1971). With

The notion of a "non-legacy signal" is both implicitly and inherently disclosed throughout the specification, including paragraphs [0027]-[0031]. Hence, the written disclosure rejection should be withdrawn. Further, since the notion of a "non-legacy" signal is implicitly and inherently disclosed, the amendments made to the specification are not new matter, and should be entered.

Also on page (5), the Office Action rejected claims 44-46 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. According to the Office Action, it is not understood how the upper layer has at the same time, the non-legacy and the legacy data. The Applicants thank the Examiner for noting this error, and have amended claim 44 accordingly.

VI. The Cited References and the Subject Invention

A. The Ishio Reference

U.S. Patent No. 4,039,961, issued August 2, 1977 to Ishio et al. disclose a demodulator for combined digital amplitude and phase keyed modulation signals. A digital carrier signal demodulation circuit is used in the carrier digital transmission system utilizing a 16-ary APK (Amplitude and Phase Keying) signal produced by the vector superposition of a second path signal consisting of a four-phase shift keying signal upon each phase of a first path signal consisting of a four-phase shift keying signal, the level of the second path signal being lower than that of the first path signal. The received 16-ary APK signal is detected with the reference carrier extracted from the received signal, regenerated to reproduce the base band pulses of the first path signal. The recovered base band pulses remodulate the reference carrier to produce the first path signal. The phases of the recovered first path signal and received signal are compared to phase lock a voltage controlled oscillator thereby producing the reference character.

B. The Anderson Reference

U.S. Patent No. 6,297,691, issued October 2, 2001 to Anderson discloses a method and apparatus for demodulating coherent and non-coherent modulated signals. A receiver receives modulated message signals in non-coherent FSK and coherent 8PSK protocols. A selectively configurable processor demodulates the message signals, and includes a demodulator that derives in-phase and quadrature signals based on the message signals. A phase detector is responsive to the in-phase and quadrature signals and delayed in-phase and quadrature signals to derive a phase signal. A selector is responsive to the in-phase and quadrature signals to selectively connect a loop filter between the phase detector and the demodulator. When the selector connects the filter between the phase detector and demodulator, the demodulator is responsive to filtered phase signals to lock onto a frequency of the message signals so that the processor operates as a phase locked loop to demodulate coherent modulated signals. When the selector disconnects the filter from between the phase detector and the demodulator, the demodulator demodulates non-coherent modulated signals and the phase detector supplies a phase signal representing the slope of the phase of the demodulated signal.

C. Differences Between the Subject Invention and the Cited References

Claims 1-46 recite that "non-coherence" of the Applicants' layered modulation signal lies in the non-coherent relationship between the upper and lower signal layers, not the non-coherence of either one or both of the signal layers by themselves (like the non-coherent FSK HART signals of the Anderson reference). Indeed, even though the Applicants' invention is directed to non-coherence between the upper and lower layer signals, it is typically practiced in embodiments wherein both the upper layer signal and the lower layer signal *are* themselves coherently modulated, but not coherent with each other. Accordingly, even if Ishio were modified as suggested, the result would still fail to teach the Applicants' invention.

Claims 37-46 further recite that the non-coherently modulated layers are used to compatibly transmit legacy data to legacy receivers, while transmitting legacy data and non legacy data (which adds to or enhances the legacy data) to non legacy receivers. All the known prior art disclose systems that use layered modulation to increase transmission throughput to non-legacy receivers, while retaining compatibility with legacy receivers do so with *coherently* layered signals. The use of *non-coherently* layered signals of the Applicants' invention permits the use of separate transmitters to independently transmit each layer of even transmitters using different modulation and coding schemes. Such capabilities are unknown in the prior art.

VII. Office Action Prior Art Rejections

A. Claims 1-46 are Patentable Over Ishio in View of Anderson

1. Even When Combined, Ishio and Anderson do not Disclose the Applicants' Invention

On page (6), the Office Action rejected claims 1-46 under 35 U.S.C. § 103(a) as unpatentable over Ishio, U.S. Patent No. 4,039,961 (Ishio) and further in view of Anderson, U.S. Patent No. 6,297,691 (Anderson). Applicants respectfully traverse these rejections.

Claim 1 recites:

An apparatus for receiving a non-coherently layered modulation signal comprising a lower layer signal non-coherently layered with an upper layer signal, comprising:

a tuner for receiving the non-coherently layered modulation signal and producing a non-coherently layered in-phase signal and a non-coherently layered quadrature signal therefrom;

an analog-to-digital converter for digitizing the non-coherently layered in-phase signal and the non-coherently layered quadrature signal; and

a processor for decoding the non-coherently layered in-phase signal and the non-coherently layered quadrature signal to produce the upper layer signal and the lower layer signal.

According to the Office Action, Ishio discloses

"receiving a layered modulation signal and producing a layered in-phase signal and a layered modulation signal and producing a layered in-phase signal and a layered quadrature signal (figure 5 block 16-17 column 4 lines 3-52."

However, claim 1 recites that the non-coherently modulation signal comprises "a lower layer signal non-coherently layered with an upper layer signal."

The Office Action acknowledges that Ishio does not teach a receiver for receiving a *non-coherently layered modulation signal comprising a lower layer signal non-coherently layered with an upper layer signal* and relies on Anderson for this teaching:

"Ishio doesn't specifically disclose that the layered modulation signal is a non-coherence signal. Anderson discloses de demodulation of non-coherently in-phase and quadrature signals modulated signals (figure 3 column 6, lines 11-45)

But the Applicants claim does not recite "demodulation of non-coherently in-phase and quadrature" signals ... it recites a receiver that receives a signal *having a lower layer non-coherently layered with an upper layer signal* ... that is, the upper and lower layers of the signal are non-coherent with one another.

This is not disclosed in either Anderson or Ishio. Ishio, as the Office Action recognizes, does not disclose non-coherency of any kind. Anderson discloses a single circuit that is capable of demodulating signals in either the HART (non-coherent) and HSH (coherent) protocols. The non-coherent HART signal is not a layered signal:

HART signals are non-coherent FSK signals that are demodulated by first mixing with a free-running local oscillator frequency of 1700 Hz, and then identifying the phase of the resultant signal. Mixing the HART signals with the 1700 Hz frequency shifts the 1,200 Hz (binary 1) and 2,200 Hz (binary 0) signals to +/–500 Hz signals. The phase of the resultant signal will either continuously increase, thus indicating that the resultant signal was derived from the 1,200 Hz signal, or the phase will continuously decrease, thus indicating that the resultant signal was derived from the 2,200 Hz signal. Bit recognition of the HART protocol is achieved by sensing whether the phase is increasing (binary 1) or decreasing (binary 0).

Anderson does not disclose or suggest the demodulation of a multi-layer modulation signal with non-coherently modulated layers.

The Office Action also indicates that the Applicants' analog to digital converter for digitizing the non-coherently layered in-phase signal and the non-coherently layered quadrature signal is disclosed as follows:

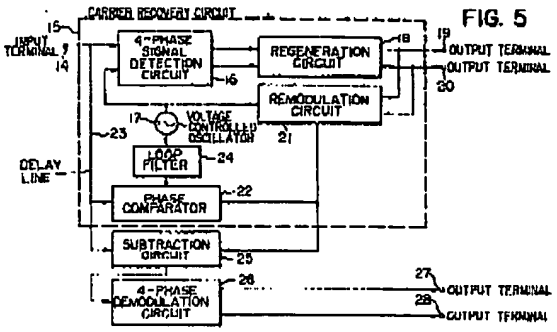


FIG. 5

FIRST EMBODIMENT, FIG. 5

Referring to FIG. 5, the first embodiment of a demodulation circuit in accordance with the present invention will be described. The input 16-ary APK signal is applied from an input terminal 14 to a four-phase signal detection circuit 16 in a carrier recovery circuit 15 (a block indicated by the dotted lines) to be coherently detected with the reference carriers of the X-and Y-axes phase shown in FIG. 4 which is produced by a voltage controlled oscillator 17. The detected output is discriminated by a regeneration circuit 18 in order to detect the quadrant in which the signal vector is present (See FIG. 4), and the outputs derived from output terminals 19 and 20 correspond to the base band pulses applied to the input terminals ch1 and ch2 shown in FIG. 3.

The outputs from the regeneration circuit 18 are also applied to a re-modulation circuit 21 in order to modulate the reference carrier from the oscillator 17 into the four-phase modulated signal corresponding to the signal vector indicated by the solid line segment in FIG. 4. That is, the first path signal is regenerated. The first path signal is applied to a phase comparator 22, to which is also applied the input signal which has been delayed by a delay line 23 by a time equal to the signal transmission delay time from the input terminal to the output of the re-modulation circuit 21. The output from the phase comparator 22 which compares the phase between the first pulse signal and the input signal from the input terminal 14, is applied through a loop filter 24 to the oscillator 17 as the control voltage. Since one of the two input signals applied to the phase comparator 22 is the first path signal while the other, the resultant or sum signal of the addition of the first and second path signal vectors, their amplitudes and phases are not exactly coincident, but the second path signal may be considered as an interference signal to the first path signal so that when the difference in level between the first and second path signals is suitably selected, the satisfactory operation of the loop controlling the oscillator 17 may be ensured.

The output from the re-modulation circuit 21 is also applied to a subtraction circuit 25 where it is vectorially subtracted from the input signal from the input terminal 14. The output from the subtraction circuit 25 is the second path signal corresponding to the signal vector indicated by the dotted line segment in FIG. 4. The second path signal is applied to a four-phase demodulation circuit 26 so that the four-phase PSK signal corresponding to the base band pulses applied to the input terminals ch3 and ch4 (see FIG. 3) may be derived from output terminals 27 and 28.

The Office Action argues

"the detection circuit 16 will detect the signal that is a digital signal and will make a digital decision of the signal of the signal, so it is digitalizing the received signal"

The Applicants respectfully disagree. Nothing in the foregoing teaches or suggests an A/D, coupled to a tuner, for digitizing a non-coherently layered in-phase signal and non-coherently layered quadrature signal.

The VCO 17 of Ishio is not a tuner. It provides a signal to the detection circuit 16. And if the detection circuit 16 is the tuner, where is the A/D converter? Further, nothing in the detection circuit 16 or the text describing it teaches that the input terminal's signal is a digital signal as the Office Action alleges. The Applicants respectfully suggest that to assert that these items are disclosed in Ishio can only be the product of hindsight reconstruction.

Claim 23 is patentable for the same reasons.

With Respect to Claims 4 and 25: Claims 4 and 25 recite that the processor performs frequency acquisition on the layered quadrature signal. According to the Office Action, this is disclosed as follows:

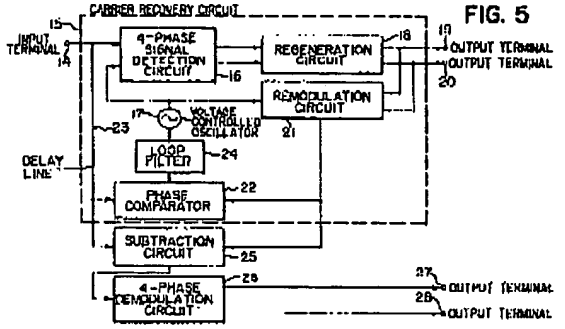


FIG. 5

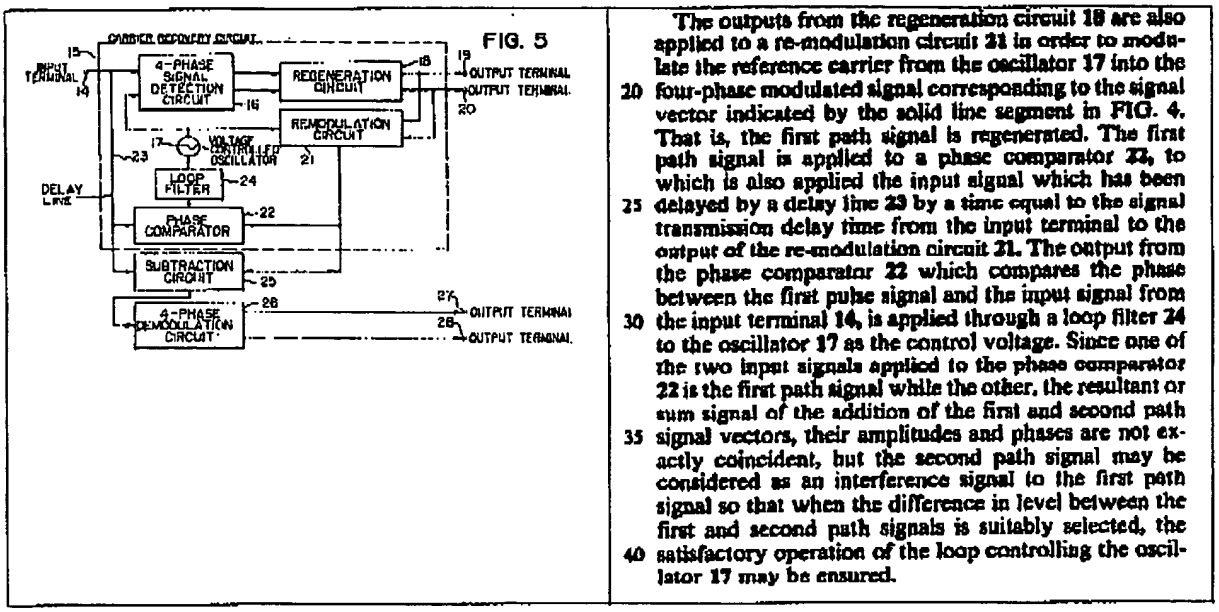
The outputs from the regeneration circuit 18 are also applied to a re-modulation circuit 21 in order to modulate the reference carrier from the oscillator 17 into the four-phase modulated signal corresponding to the signal vector indicated by the solid line segment in FIG. 4. That is, the first path signal is regenerated. The first path signal is applied to a phase comparator 22, to which is also applied the input signal which has been delayed by a delay line 23 by a time equal to the signal transmission delay time from the input terminal to the output of the re-modulation circuit 21. The output from the phase comparator 22 which compares the phase between the first pulse signal and the input signal from the input terminal 14, is applied through a loop filter 24 to the oscillator 17 as the control voltage. Since one of the two input signals applied to the phase comparator 22 is the first path signal while the other, the resultant or sum signal of the addition of the first and second path signal vectors, their amplitudes and phases are not exactly coincident, but the second path signal may be considered as an interference signal to the first path signal so that when the difference in level between the first and second path signals is suitably selected, the satisfactory operation of the loop controlling the oscillator 17 may be ensured.

However, the foregoing appears to disclose a phase comparator circuit, it does not appear to disclose a processor performing frequency acquisition of the layered quadrature signal. Accordingly, the Applicants respectfully traverse.

With Respect to Claims 11 and 33: Claim 11 recites:

The apparatus of Claim 10, wherein delaying the layered in-phase signal and the layered quadrature signal are delayed by correlating to the ideal in-phase upper layer signal and the ideal quadrature upper layer signal.

According to the Office Action, these features are disclosed by the delay line 23 of FIG. 5 and the line 23 of column 4 of the specification as follows:



The outputs from the regeneration circuit **18** are also applied to a re-modulation circuit **21** in order to modulate the reference carrier from the oscillator **17** into the four-phase modulated signal corresponding to the signal vector indicated by the solid line segment in FIG. **4**. That is, the first path signal is regenerated. The first path signal is applied to a phase comparator **22**, to which is also applied the input signal which has been delayed by a delay line **23** by a time equal to the signal transmission delay time from the input terminal to the output of the re-modulation circuit **21**. The output from the phase comparator **22** which compares the phase between the first pulse signal and the input signal from the input terminal **14**, is applied through a loop filter **24** to the oscillator **17** as the control voltage. Since one of the two input signals applied to the phase comparator **22** is the first path signal while the other, the resultant or sum signal of the addition of the first and second path signal vectors, their amplitudes and phases are not exactly coincident, but the second path signal may be considered as an interference signal to the first path signal so that when the difference in level between the first and second path signals is suitably selected, the satisfactory operation of the loop controlling the oscillator **17** may be ensured.

The foregoing merely teaches delaying the signal by a time equal to the signal transmission delay time from the input terminal to the output of the remodulation circuit. It does not, however, disclose that this is accomplished by *correlating the ideal in-phase upper layer signal with the ideal quadrature layer signal*, as recited in claim 11.

Claim 33 recites analogous features and is patentable for the same reasons.

With Respect to Claims 14 and 36: Claim 14 recites:

The apparatus of Claim 12, wherein signal processing the ideal in-phase upper layer signal and the ideal quadrature upper layer signal comprises applying a signal map to the ideal in-phase upper layer signal and the ideal quadrature upper layer signal, the signal map accounting for transmission distortions of the layered signal.

According to the Office Action, this is disclosed by the remodulation circuit 21 of FIGs. 5, 2, 8, and 9, and in the following text:

> **The outputs from the regeneration circuit 18 are also applied to a re-modulation circuit 21 in order to modulate the reference carrier from the oscillator 17 into the four-phase modulated signal corresponding to the signal vector indicated by the solid line segment in FIG. 4.**

However, the foregoing merely teaches remodulation ... there is no disclosure or teaching of the use of a signal map to account for transmission distortions.

With Respect to Claim 16: Claim 16 recites:

> *A processor for decoding a non-coherently layered modulation signal comprising a lower layer signal non-coherently layered with an upper layer signal into the upper layer signal and the lower layer signal, comprising:*
>
> *a first demodulator and first decoder for demodulating and decoding the upper layer signal from the non-coherently layered modulation signal and providing the demodulated and decoded upper layer signal at a first output;*
>
> *an encoder for generating an ideal upper layer signal from the decoded upper layer signal;*
>
> *a signal processor for modifying the ideal upper layer signal to characterize transmission and processing effects;*
>
> *a subtractor for subtracting the modified ideal upper layer signal from the non-coherently layered modulation signal to produce the lower layer signal; and*
>
> *a second demodulator and second decoder for demodulating and decoding the lower layer signal and providing the decoded lower layer signal at a second output.*

As was the case with claim 1, Ishio and Anderson, even when combined, do not teach a first demodulator and a first decoder for demodulating and decoding an upper layer signal from a non-coherently layered modulation signal that has a lower layer signal non-coherently layered with an upper layer signal (not merely a device which handles either a coherent signal or a non-coherent signal, as Anderson describes).

Ishio also fails to teach a signal processor for modifying the ideal upper layer signal to characterize transmission and processing effects. The Office Action relies on block 21 of FIG. 5 of the Ishio reference and the following text:

> **The outputs from the regeneration circuit 18 are also applied to a re-modulation circuit 21 in order to modulate the reference carrier from the oscillator 17 into the four-phase modulated signal corresponding to the signal**

but this does not teach modifying the upper layer signal to characterize transmission and processing effects, as recited in claim 16.

With Respect to Claims 17-22: Claims 17-22 are patentable for the same reasons as claim 16, and also because they recite other features not disclosed or taught by the Ishio reference as described above with respect to claims 2-15.

With Respect to Claims 38-40: Claims 38-40 recite that upper layer signal is a legacy signal and the lower layer signal is a non-legacy signal.

The Office Action argues that Ishio inherently discloses that the upper layer signal is a legacy signal and the lower layer signal is a non-legacy signal as follows:

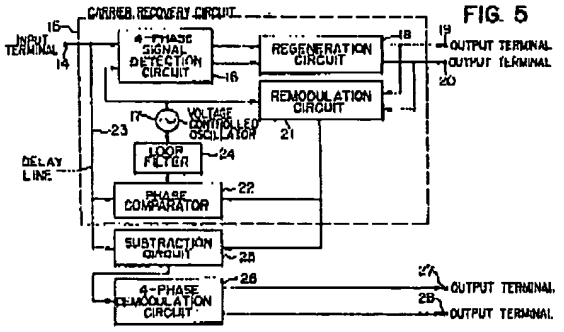


FIG. 5

10 phase shown in FIG. 4 which is produced by a voltage controlled oscillator 17. The detected output is discriminated by a regeneration circuit 18 in order to detect the quadrant in which the signal vector is present (See FIG. 4), and the outputs derived from output terminals 19 15 and 20 correspond to the base band pulses applied to the input terminals ch1 and ch2 shown in FIG. 3.

Another object of the present invention is to provide 65 a digital carrier signal demodulation circuit simple in construction yet capable of increasing the information transmission rate.

The Office Action then proceeds to describe a rationale for concluding that a "legacy" and "non-legacy" signal are inherently disclosed in Ishio, none of which is even remotely based on what Ishio actually discloses. The terms "legacy", "non-legacy", "new system" and not present or intimated by the Ishio disclosure itself ... they are a product of hindsight reconstruction using the Applicants' disclosure.

Especially curious is how the Office Action can, on one hand, argue that the Applicants' disclosure does not disclose a "non-legacy" signal, when it expressly recites a "legacy signal", while at the same time argue that Ishio, which recites neither "legacy," "non-legacy," or anything of the sort, can disclose the very same thing under the inherency doctrine.

In any case, inherency "may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Continental Can Co.*

v. Monsanto Co., 948 F.2d 1264, 1269(Fed. Cir. 1991). Instead, to establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." *Continental Can Co.*, 948 F.2d at 1268.

In finding anticipation by inherency, the Office Action ignored the foregoing critical principles. The Office Action has not shown that non-legacy and legacy signals are necessarily present in this description.

With Respect to Claims 41-43: Claim 41 recites:

In a system broadcasting a legacy signal having legacy data to a plurality of legacy receivers, a method of increasing data throughput of the system so as to transmit the legacy data to the legacy receivers while compatibly transmitting the legacy data and non-legacy data adding to or enhancing the legacy data to a plurality of non-legacy receivers, comprising:

transmitting a non-coherently layered modulation signal to the legacy receivers and the non-legacy receivers;

wherein the non-coherently layered modulation signal comprises a lower layer signal and an upper layer signal non-coherently layered with the lower layer signal; and

wherein the upper layer signal comprises the legacy data and the lower layer signal comprises the non-legacy data.

As described above, even when combined, Ishio and Anderson fail to disclose transmitting a non-coherently layered modulation signal comprising a lower layer signal and an upper layer signal non-coherently layered with the lower layer signal. Nor do they disclose the notion of legacy and non-legacy data in each respective layer. Accordingly, the rejection of claims 41 is traversed. Claims 42-43 is patentable for the same reasons.

With Respect to Claims 44-46: Claim 44 recites:

In a system broadcasting a legacy signal having legacy data to a plurality of legacy receivers, a method of increasing data throughput of the system so as to transmit the legacy data to the legacy receivers while compatibly transmitting the legacy data and non-legacy data adding to or enhancing the legacy data to a plurality of non-legacy receivers, comprising the steps of:

receiving a non-coherently layered modulation signal comprising a lower layer having the legacy data non-coherently layered with an upper layer signal having the non-legacy ~~second~~ data, wherein the upper layer signal comprises the legacy data and the lower layer signal comprises the non-legacy data;

demodulating the upper layer signal from the non-coherently layered modulation signal and providing the demodulated upper layer signal having the legacy data to a first output;

remodulating the demodulated upper layer signal;

subtracting the remodulated ideal upper layer signal from the non-coherently layered modulation signal to produce the lower layer signal;

demodulating the lower layer signal and providing the demodulated lower layer signal having the non-legacy data to a second output.

As described above, even when combined, Ishio and Anderson fail to disclose receiving a non-coherently layered modulation signal comprising a lower layer signal and an upper layer signal non-coherently layered with the lower layer signal. Nor do they disclose the notion of legacy and non-legacy data in each respective layer. Accordingly, the rejection of claims 44 is traversed. Claims 42-43 are patentable for the same reasons.

2. The Combination of the Ishio and Anderson References is Improper Under 35 U.S.C. § 103(a)

The Applicant responds to the Office Action's arguments with regard to the appropriateness of combining the Ishio and Anderson references as follows:

Regarding Whether the Applicant Inappropriately Attacked the References Individually: The Applicants have pointed out that neither the Anderson Reference nor the Ishio reference, even when combined, do not disclose a system wherein the "non-coherence" of the layered modulation signal lies in the non-coherent relationship between the upper and lower signal layers instead of the non-coherence of either one or both of the signal layers by themselves.

Regarding the Argument that the Motivation to Modify Ishio as Described in Anderson is to Demodulate "Coherence" and "Non-Coherence" Signals with the Same Decoder: This rationale was raised earlier, and the Applicants' answer remains the same:

> "The Applicants respectfully disagree. Anderson discloses a single circuit that is capable of demodulating signals in either the HART (non-coherent) and HSH (coherent) protocols. It does not disclose or suggest the demodulation of a multi-layer modulation signal with non-coherently modulated layers. Further, if one of ordinary skill in the art were to want to modify the Ishio system to allow compatibility with other systems (the Office Action's proffered motivation for modifying Ishio as described in Anderson), Anderson teaches that he/she would do so with a circuit that would operate with either one signal or the other, not by combining non-coherent layers."

Regarding the Argument that the Motivation to Modify Ishio as Described in Anderson is to Increase the Transmission Data Rate of the Systems: Here, the Office Action argues:

> "Another suggestion/motivation for doing so would have been to increase the transmission data rate of the systems (Ishio column 1, lines 65-68). Ishio builds a system where every constellation point of a legacy system is modulated with several modulation points, so while a legacy system will see only one modulation symbol, a new system will be able to discern several modulation symbols in that legacy modulation symbol, for that reason the new system will be able to produce higher data rates and the old systems will be able to still operate with the new transmitted signal but with the old data rate"

First, the Applicants note the Office Action's inclusion of the term "legacy" when summarizing the Ishio reference. The notion of "legacy" and "non-legacy" systems or inter-compatibility does not appear to be discussed in the reference itself, but rather, fashioned from hindsight reconstruction. Any reliance on this notion is therefore misplaced.

Second, the Applicant notes that there are many ways to increase the throughput of a system, including the technique that Ishio teaches ... using higher order signal constellations. Assuming arguendo that one of ordinary skill in the art would be motivated to increase the transmission rate of the system, the Office Action does not explain why the artisan would not do what Ishio itself teaches ... simply use higher order signal constellations.

The Office Action continues:

> "In figure 5, Ishio modulates each of the 4 old legacy modulation symbol with 4 symbols that are coherent with the legacy modulation symbol with 4 symbols that are coherent with the legacy modulation symbol, and Ishio discloses that these signals are coherent, but obviously any other type of modulation can be used as well."

The Applicants respectfully disagree that it is "obvious" that any other type of modulation can be used with the Ishio reference, and traverse this statement under MPEP § 2144.03. The Applicant knows of no such prior art system using "any other type of modulation".

> "This is disclosed in figure 6 where every of the 4 legacy symbols is divided in 16 new symbols, each legacy of the 4 initial symbols become 16 possible new symbols, so the symbol rate is increased by 16 ..."

Again, the Applicant objects to the Office Action's injection of the notion of "legacy symbols." There is no such discussion in the Ishio reference. Further, the foregoing statement can

be said about any system using a higher order constellation. Also, in going from a 4 symbol system to a 16 symbol system, the symbol rate is increased by a factor of 4, not 16.

Finally,

> "... the new receiver will also be able to decode the non-legacy signal, in principle the new receiver will have to be of a better quality receiver than the legacy receiver because it has to discern in 16 possibilities where before was only 1; in this case Ishio doesn't disclose the necessity of coherence between signals. The new receiver will be able to work with legacy and non-legacy system, but the legacy receiver will be able to work only with legacy system."

As the Applicants understand the Office Action's hypothetical receiver, the "new" receiver will discern 16 possibilities where there once were *four*, not *one*.[1] Again, the Applicants object to the use of the notions of legacy, non-legacy, summarizing what Ishio discloses. And finally, the argument that "Ishio doesn't disclose the necessity of coherence between signals" is not the standard under which obviousness is judged under 35 U.S.C. § 103(a).

VIII. Dependent Claims

Dependent claims 2-5, 7-15, 17-22, 24-40, 42-43, and 45-46 incorporate the limitations of their related independent claims, and are therefore patentable on this basis. In addition, these claims recite novel elements even more remote from the cited references. Accordingly, the Applicants respectfully request that these claims be allowed as well.

[1] Indeed, if there was only one possibility, there would be no information whatever in the signal.

IX. Conclusion

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited. Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicants' undersigned attorney.

Respectfully submitted,

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By: _____
Name: Georgann S. Grunebach
Reg. No.: 33,179

The DIRECTV Group, Inc.
RE/R11/A109
2250 E. Imperial Highway
P. O. Box 956
El Segundo CA 90245

Telephone No. (310) 964-4615